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(54) Title of the Invention: Device for measuring environmental conditions  
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#### Specification

1. Title of the Invention:

Device for measuring environmental conditions

2. Claim(s):

A device for measuring environmental conditions that has an environmental condition detection sensor, a memory comprising an integrated circuit, a timer means, and a control device that defines the relationship between the data on environmental conditions outputted by said sensor and the timing outputted by said timer means, and that writes the same to said memory, wherein a recording means is not equipped internally, and wherein it is possible to output the said data on environmental conditions and said times which have been written to said memory to an external recording device.

3. Detailed Explanation of the Invention

(Area of Industrial Application)

The present invention relates to devices for measuring environmental conditions that measure changes in environment conditions experienced by products during the distribution process thereof, or other changes in environment conditions, and that store the results of those measurements along with the associated times.

Furthermore, the CPU 1 reads in, at the required intervals, the digital temperature and humidity data obtained in the output of the A/D converter 7, as described above, not only writing it to the RAM 9 but also displaying it on a display device 11.

At this point, because there are typically no rapid changes in temperature or humidity, in the present invention the said reading-in of data is performed at three different time intervals: once each minute, once every five minutes, and once every 10 minutes. The actual timing interval for reading in the data is specified in advance using the operating switch unit 10.

The CPU 1 reads in time stamps from the timer means at the same time it reads in the aforementioned temperature and humidity data, correlating said time stamps to said temperature and humidity data, and writing the results to the RAM 9.

The result of the above is that, in the present measurement device, changes in environmental conditions experienced by the product during distribution can be measured and stored over extended periods of time without requiring human operation. Furthermore, if a measurement has been completed by the time the product for which the measurement has been performed arrives at the end of the distribution process, then the measurement device can be connected to an external device in an office, laboratory, or the like, to read the temperature and humidity data, along with the time stamps from the RAM 9, making it possible to record the temperature and humidity in an external device as a function of time.

Figure 2 shows an example of the external device described above. No. 12 is a CPU, such as a microprocessor. No. 13 is a data-input interface inserted between this CPU 12 and the aforementioned measurement device 1. No. 14 is an operating switch unit. No. 15 is an X-Y plotter. No. 16 is a data output interface inserted between the CPU 12 and the X-Y plotter 15.

The temperature, humidity, and timestamp data read out from the RAM 9 of the aforementioned measurement device by the CPU 1 of the aforementioned measurement device are outputted serially through the interface 13 to the CPU 12 of the external device. Said CPU 12 outputs this data through a parallel interface 16 to the X-Y plotter 15, where the temperature-time and humidity-time waveforms are recorded on said plotter 16.

Although the present invention has so far been explained only with respect to cases in which changes in environmental conditions experienced by a product in the distribution process are measured, the present invention can also be applied appropriately to measurement devices that measure changes in the environment conditions experienced by passengers in airplanes, ships, automobiles, and other vehicles.

#### (Effect(s) of the Invention)

The device for measuring environmental conditions set forth in the present invention, as described above, is able to measure changes in the environmental conditions experienced by a product during the distribution process, or changes in the other environment conditions, over extended periods of time without requiring human attendance, and is able to store the data and the associated timing thereof so that, after the measurements have been completed, the stored data on environmental conditions and the timing associated therewith can be outputted to an external recording device, making it possible to record, in the external recording device, the

relationship between the data for said environment conditions and the timing thereof, thus producing a superior effect.

#### 4. Brief Explanation of the Drawings

Figure 1 is a block diagram illustrating an example embodiment of the device for measuring environmental conditions set forth in the present invention.

Figure 2 is a block diagram showing an example of an external device for recording the data on environmental conditions that has been measured and stored in memory by the device for measuring environmental conditions set forth in the present invention.

- 1: CPU
- 2: Temperature Sensor
- 3: Humidity Sensor
- 8: Timer Means
- 9: RAM
- 16: X-Y plotter

#### Figure 1

[see original for figure]

- 2: Temperature Sensor
- 3: Amplifier
- 4: Humidity Sensor
- 5: Amplifier
- 10: Operating Switch Unit
- 6: Analog Switch
- 8: Timer Means
- 11: Display Device
- [text to the right of and below No. 11]: data output

#### Figure 2

[see original for figure]

[on left]... from the CPU 1

- 14: Operating Switch Unit
- 13: Interface
- 16: Interface
- 15: X-Y Plotter